Notes: 11/18/2014

News item 1:
Ingenic's newton 2

- IOT targeted processor, big little core design
- discussion of battery life scaling for wearables

News item 2:
IBM TrueNorth

- 'brain chip'
- 1M 'neurons' with 256M 'synapses'

News item 3:
TOP500 is replacing LINPACK with Conjugate gradient

- announced every 6 months since 1993
- 6 orders of magnitude performance improvement between 1993 and June 2014
- conjugate gradient: iterative method of solving types of linear equations
- focuses more on data access than computation
- has both exact and inexact computation

Lecture notes:

Admin topics: grading, presentation signup, presentation judging form

Sampling Techniques, Yi HPCA 2005:

1. Simpoint
2. Reduced input sets (MinneSPEC and SPEC test/train)
3. Simulate first Z million instructions (from beginning)
4. fast forward X million, then simulate Z (avoid initialization)
5. Periodic Sampling as in SMARTS
    a. selected portions of dynamic instructions at intervals
    b. control frequency and length of samples for total data collection
    c. uses sampling theory to estimate CPI error

    Simpoint vs. SMARTS
    Simpoint uses clustering, no error bounds, analyzes the data (representative sampling)

    [Charts in slides: decision tree to look at which method to use]

Markov Chain

- probabilities don't depend on other states, just current state.

Statistics:

- Confidence interval for the mean: as n-> inf, distribution becomes gaussian

- can find confidence interval using mean and stddev
- Bessel: one less degree of freedom is why (n-1) on standard deviation formula

Meaning of confidence interval:

- If 90% CI, there's a 90% chance that the actual value is within the range
- For a given sample, a larger confidence interval means a wider range of values that the actual value can be between.

Coefficient of Variation:

- compares relative size of variation to mean value
- no dimension
- tells how much the data varies

[Slide updating the temporal density numbers]